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CHERRY CULTURE IN CALIFORNIA

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GENERAL REVIEW OF THE INDUSTRY

Practically all of the sweet cherries produced in the United States are produced in the three western states: California, Oregon, and Washington. The sour or pie cherries are practically all produced in the states east of the Rocky Mountains. California acreage and production are shown in table 1.

TABLE 1

BEARING ACREAGE AND PRODUCTION OF CHERRIES IN CALIFORNIA*

Year	Acreage	Production, tons	Farm value per ton, Dec. 1	Total value
1919	8,750	12,400	$150 00	$1,860,000
1920	8,884	17,500	200 00	3,500,000
1921	8,758	13,000	125 00	1,625,000
1922	9,317	14,000	180 00	2,520,000
1923	9,646	17,000	160 00	2,720,000
1924	9,981	13,500	140 00	1,890,000
1925	10,433	12,000	160 00	1,920,000
1926	10,828	20,000	180 00	3,600 000
1927	11,521	12,000	180 00	2,160,000
1928	12,569	18,500	150 00	2,775,000
1929	13,260	16,000	190 00	3,040,000
1930	14,300†			
1931	15,400†			
1932	16,300†			
Average		15,081 8	$165 00	$2,510,000

* From California Crop Report, California State Department of Agriculture. Production and value figures for 1919–1924 from special publication No. 63, 1925. Other figures from special publication No. 96, 1928, and from mimeographed Summary, 1929, December 27, 1929.

† Forecast of bearing acreage of cherries.

A glance at the bearing acreage of cherries shows a gradual increase, from 1919 to 1929 with a continued forecasted increase to 1932. The production, however, does not show a regular increase with increased acreage. This is due to favorable or unfavorable weather during the blossoming and harvesting season. The low yield of 1925 and 1927 is the result of unfavorable weather conditions while the 1926 crop indicates a favorable season. Farm value per ton, together with total farm value is also included.

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Table 2 shows the interstate carlot shipment of fresh cherries from California and the total cases of cherries canned annually since 1895, together with the comparative pack of the Northwest (Oregon, Wash-

TABLE 2

INTERSTATE SHIPMENT OF FRESH CHERRIES FROM CALIFORNIA, CASES CANNED IN THE STATE, AND COMPARATIVE PACKS FROM THE NORTHHWEST*

Year	Interstate shipment, carlots**	Cases of cherries packed†	Comparative packs of Northwest (Ore., Wash., Idaho)
1895	180	98,061	.....
1896	88	69,056	.....
1897	239	149,383	.....
1898	297	172,376	.....
1899	85	53,709	.....
1900	238	163,317	.....
1901	110	63,008	.....
1902	245	201,824	
1903	211	211,119	
1904	209	145,715	
1905	79	74,886	
1906	150	161,950	
1907	98	148,715	
1908	208	212,310	
1909	250	205,280	
1910	250	215,210	
1911	216	221,320	
1912	244	384,455	
1913	231	175,115	
1914	166	115,155	
1915	205	182,750	
1916	164	168,785	
1917	330	440,134	
1918	356	360,090	
1919	335	460,614	251,052
1920	494	647,977	353,861
1921	665	222,772	211,783
1922	502	557,591	357,596
1923	602	590,685	399,455
1924	711	215,114	380,632
1925	512	222,816	329,924
1926	741	526,520	708,990
1927	579	170,909	356,114
1928	885	280,126	634,041
1929‡	605	393,750	607,962

* California Crop Report 1928, California State Dept. Agr. Spec. Pub. 96.

** Shipments from 1895 to 1920, inclusive, are from north of the Tehachapi only.

† Figures from 1895 to 1905 inclusive, are calculated, as no data on total packs by varieties are available.

‡ Personal correspondence with E. E. Kaufman, California Crop Reporting Service.

ington, and Idaho) since 1919. Practically all the canned sweet cherries of the Pacific Coast consist of one variety, the Napoleon. It will be noted that there is a marked fluctuation from year to year in the cherries shipped and canned which is influenced in general by the

tonnage produced. It should be noted that a marked increase has also taken place in the cherry pack of the Northwest which competes directly with the California pack. This fact should influence the selection of varieties for new plantings. Napoleon is the only variety canned and it is not a desirable shipping variety. Therefore, with increased production of Napoleon not only in California but also in the Northwest, competition will be more severe. The probable outcome will be less returns to the grower. On the other hand the black shipping varieties are dessert fruit only and, since California cherries are practically all shipped before the Northwest starts, it would seem that the better outlook is for the production of shipping sorts. California growers have no competition on the fresh market with other cherry sections. It must also be kept in mind, however, that production in California is increasing as is shown in tables 1 and 2, by acreage, tonnage, cases canned, and cars of fruit shipped. Wellman and Braun[2] state that additional plantings of Napoleon cherries are not justified unless the market for Maraschino cherries is expanded. They also feel that plantings of shipping sorts can only be profitably increased in particularly favorable locations.

SOIL AND CLIMATIC REQUIREMENTS OF THE CHERRY

The cherry is rather exacting with regard to its climatic requirements. Cherries are not adapted to most locations in the great interior valleys, probably due to the high temperatures and low humidity encountered in these districts. There are areas in the interior, however, where the cherry does well, but in most of these instances the climatic conditions are modified by coastal influences.

The cherry is one of the most exacting fruit trees as to its soil requirements. It will not do satisfactorily on the heavy, wet soils of the state—trees on Stockton Morello root possibly excepted—nor is it satisfactory on the dry, sandy soils. For successful results cherries should be, in general, grown only on light, moist, well drained loams. The alluvial sedimentary soils close to river and creek banks are ideal for the cherry. The light, mellow soil of the foothills is also suitable, while the clays and adobe are unsatisfactory. Additional information on cherry soils is given under rootstocks.

[2] Wellman, H. R., and E. W. Braun. Cherries. California Agr. Exp. Sta. Bul. 488:1–38. 1930.

CHERRY DISTRICTS

Figure 1 shows the different counties having 100 acres or more of cherry trees. While forty-five counties of the state have some cherries, 10,486 acres are growing in Santa Clara, San Joaquin, Sonoma, and Solano counties. The remaining 8,421 acres are scattered over forty-one counties, the larger acreage, however, being in or adjoining the San Francisco Bay region.

Santa Clara Valley District.—The largest district is the Santa Clara Valley, including Santa Clara and Alameda counties with the bulk of the acreage in the former county. This district produces mainly mid-season and late varieties such as Black Tartarian, Bing, Napoleon, and Black Republican. A large tonnage of the Napoleon variety is produced in this district for canning and other types of processing. Recently, considerable acreage of shipping varieties has come into production, particularly of Bing and Republican. Production in this district normally is very good. Generally pests are not serious, although in some years brown rot causes heavy loss.

Lodi–Farmington–Stockton District.—This district of San Joaquin County is second in importance in acreage. As the younger acreage comes into bearing the production should rapidly increase. This district is primarily a shipping section. The Napoleon is less desirable here than the black sorts. It does not develop as well as in the Santa Clara Valley and is prone to produce double fruits, which are objectionable. In some seasons 20 or 30 per cent doubles are produced. The Bing in some years also produces doubles, but generally not as many as the Napoleon. The varieties grown are Bing, Lambert, Chapman, Burbank, Tartarian, Black Republican, and Napoleon. Pests are not generally very serious. Occasionally cherry slugs cause some damage.

Sonoma County District.—The Occidental district is the largest section in Sonoma County although there is quite a large acreage in the vicinity of Sonoma. The Napoleon is the most important variety in the Occidental district. There are also some black cherries produced but most growers say they are unprofitable because of the lateness of the district. The black varieties grown extensively are Burbank, Bing, Black Tartarian, Black Republican, and Lambert. The same varieties are grown near Sonoma, and, since it is an earlier section than Occidental, the black shipping varieties are more profitable.

Both sections are troubled with leaf spot and brown rot. In seasons favorable for the development of fungus diseases serious loss is sustained.

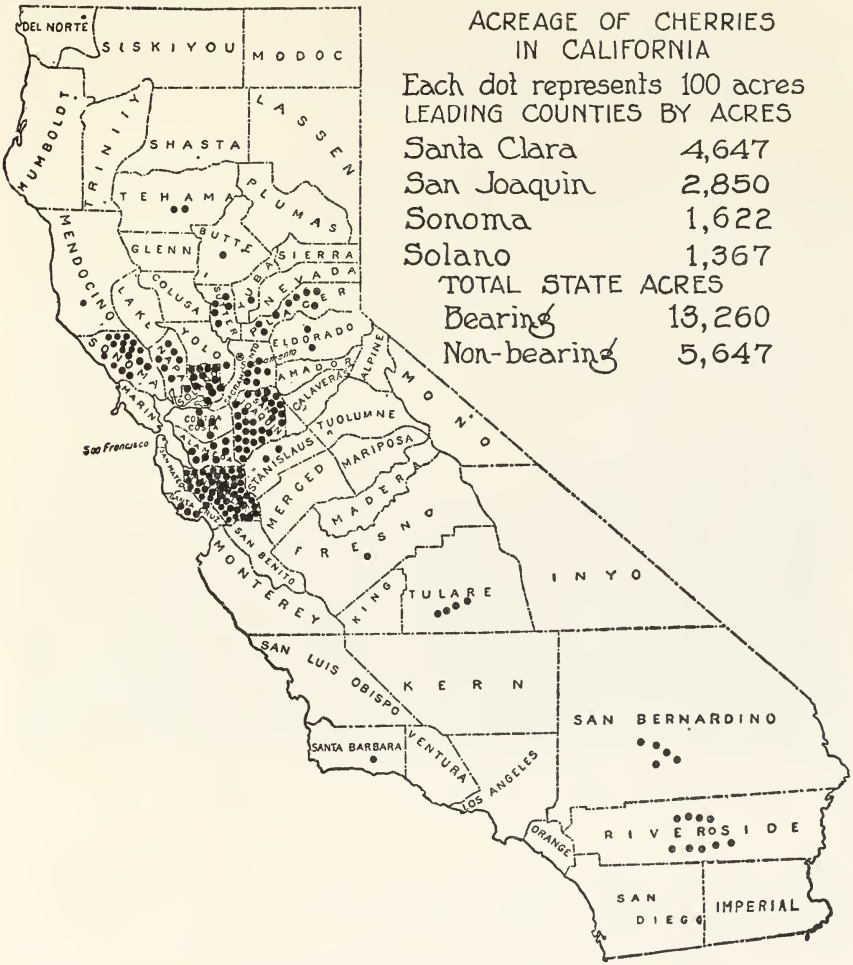

Fig. 1.—Outline map of California showing cherry acreage by counties. From California Crop Report, 1928.

Vacaville–Cordelia District.—The Vacaville–Cordelia section of Solano County is an important, early-shipping district growing Chapman, Burbank, Black Tartarian, Bing, Napoleon, and Lambert extensively. Napoleon is, however, not considered as desirable as the black sorts for this district.

Fungus diseases are not normally as serious as in the coastal districts where climatic conditions are more favorable for their develop-

ment. Some seasons serious loss results from insect attack, especially thrips and cankerworms. Figure 2 shows a typical cherry orchard in the Vaca Valley.

Beaumont District.—The Beaumont district in Riverside County is the most extensive cherry section in southern California. The bulk of the plantings consist of Black Tartarian, Napoleon, Bing, and Lambert with a few sour sorts. The majority of the fruit is sold

Fig. 2.—A typical California cherry orchard about 18 years old. Trees in the foreground are Napoleon (Royal Ann).

at the orchard or shipped to Los Angeles in lugs. A small quantity is shipped to Arizona. With the exception of the bark beetle, there is very little injury from insects; and normally diseases are not serious.

Yucaipa District in San Bernardino County.—Conditions in this district are similar to those of the Beaumont district although there is not nearly the acreage in cherries.

Placer County District.—This district is mainly an early-shipping section. The important varieties are Burbank, Chapman, Black Tartarian, Bing, Napoleon, Black Republican (Black Oregon), and Lambert. Growers do not like the Napoleon as a shipping variety and it produces double fruit rather badly. The variety generally does not size as well as it does in the coastal districts. The Black Republican

also fails to size satisfactorily some seasons. Diseases are not generally serious. Thrips and cankerworms some years become quite a pest.

Sacramento River District.—The majority of cherries in Sacramento County are produced along the Sacramento River. Chapman, Burbank, Black Tartarian, Napoleon, and Bing are the main varieties grown. It is an early but not extensive district and the fruit is generally shipped. Pest conditions are similar to the Stockton district.

Marysville District.—Most of the cherries in this district are in Sutter County and consist of Chapman, Burbank, Black Tartarian, Bing, Napoleon, and Black Republican. Fruit ripens relatively early and all but Napoleon are shipped. Both Napoleon and Bing double seriously.

Napa Valley District.—The conditions existing in the Napa Valley are similar to those of the Sonoma area of Sonoma County. The varieties grown are Black Tartarian, Bing, Chapman, Napoleon, and Black Republican.

GROUPS OF CHERRIES

There are three groups of cherries: Sweet cherries (*Prunus avium*), sour or pie cherries (*Prunus cerasus*), and "Duke cherries," hybrids between *P. avium* and *P. cerasus.*

The majority of the sweet cherries grown in the United States are produced in the Pacific Coast states. California produces the bulk of the Pacific Coast sweet cherries. Neither sour nor Duke cherries are commercially grown in California. Small commercial plantings of sour cherries are found in western Oregon and Washington, though the main production is confined to the northeastern United States. The Duke varieties are of little importance for commercial planting anywhere in the United States.

Important Commercial Varieties.—The leading varieties of sweet cherries grown in California in their approximate order of ripening are:

Early Purple (Early Purple Guigne)
Knight (Knight's Early Black)
Chapman (Early Chapman)
Burbank
Black Tartarian
Bing
Napoleon (Royal Ann)
Black Republican (Black Oregon, Lewelling)
Lambert

Of the above list probably Burbank, Chapman, Black Tartarian, Bing, Black Republican, Lambert, and Napoleon are the most important. The Napoleon is the only variety used for canning and processing. It is a white-fleshed variety. All others are dark colored sorts and used only for fresh shipment, excepting a very small quantity which is dried.

Sour cherries are grown to a very limited extent and only for local trade. The varieties generally grown are Early Richmond, Montmorency, and English Morello.

Of the Duke varieties suggested for California, the most promising sort is probably May Duke.

DESCRIPTION OF VARIETIES

Abundance.—Originated by Luther Burbank as a seedling of Napoleon. A white-fleshed sort, roundish cordate, rather similar to Napoleon; ten days later in ripening, tends toward small size, good flavor, cans well, may have promise as a late canning variety in certain locations.

Bing.—Seedling of Black Republican originated in Oregon. One of the best shipping sorts, large cordate, mid-season; flesh firm, very meaty, sweet, of very good quality; ripens uniformly. Tree vigorous, upright spreading. Tends to produce doubles in the interior valleys and foothills some seasons. Season, May 15 to June 15. There are a number of cherries similar to Bing (fig. 3).

Long stemmed Bing may be a strain of Bing or a variety similar to Bing; ripens later, thought by some to be a better producer than Bing.

Black Tartarian.—An old Europeon variety. Extensively grown. Large, black, cordate, early, tender-fleshed, sweet, very good quality. Tree vigorous, very upright; season, May. Earliest variety recommended for later sections where fruit is in competition with mid-season varieties from early sections. There are a number of strains of this variety or a number of seedlings which are very similar to it. Most strains are good pollinizers for Napoleon and Bing (fig. 4).

Burbank.—Originated by Luther Burbank as a seedling of Early Purple. Very early; fruit large, cordate, dark red, sweet, rather tender flesh, good quality, cracks rather badly in rainy season. Tree upright, vigorous with large dense foliage. Not recommended com-

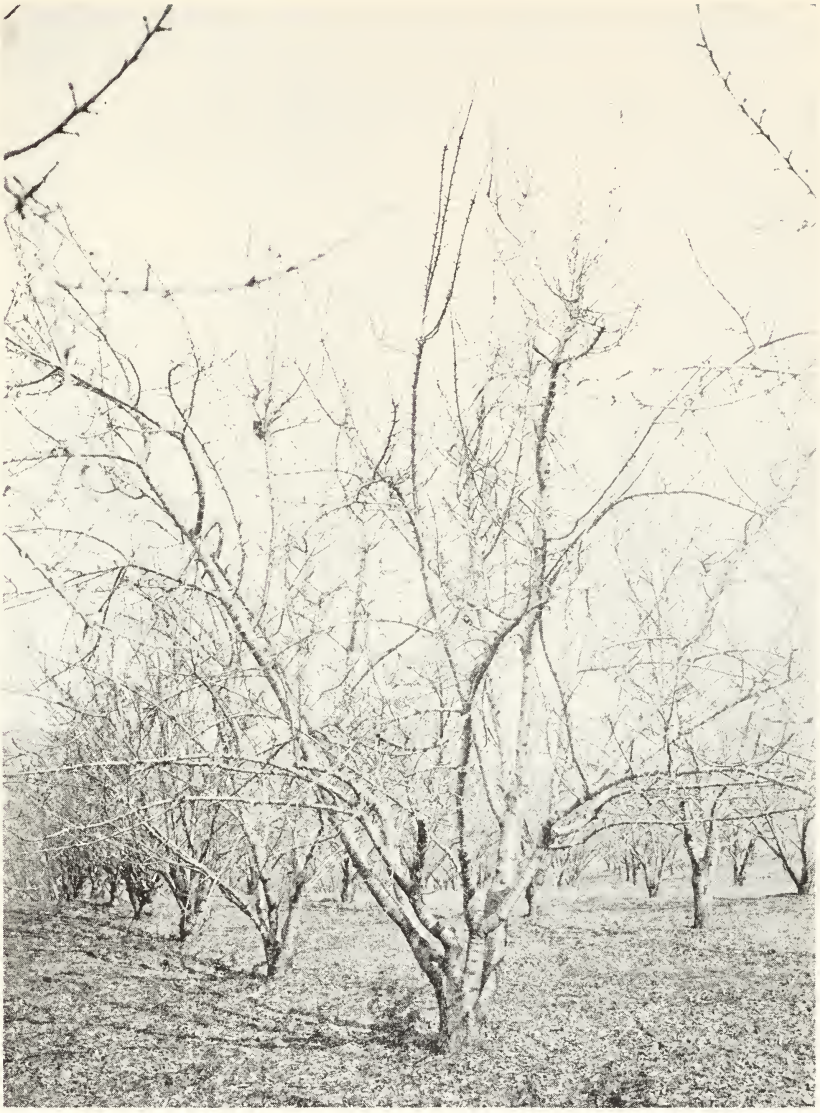

Fig. 3.—Bing cherry tree about 25 years old. Note the typical spreading type of growth.

Fig. 4.—Typical Black Tartarian cherry tree 17 years old.
Note the upright habit of growth.

mercially for late sections. Season, May 5–20. Not considered by many as desirable as Chapman for most sections. It is more subject to cracking and generally not as productive as Chapman.

Black Republican.—Originated in Oregon; also known as Black Oregon and Lewelling. Medium to large, medium late, black, round-cordate, firm flesh, sweet, high quality, good shipper. Tree upright spreading, very productive, tends to overbear at expense of size of fruit. Appears to size better in coastal sections than interior or foothill sections. Undoubtedly there are several strains of this variety

Fig. 5.—Fifty-year-old Black Republican cherry tree showing typical growth of the variety. This tree has produced over 1,200 pounds of marketable cherries in one season.

or else several varieties very similar; good pollinizer for Bing and Napoleon. Season, May 20 to June 20 (figs. 5, 6).

Chapman.—Seedling of Black Tartarian, originated at Napa, California. Very early, medium to large, cordate, black, sweet, rather tender flesh, good quality, one of the best very early sorts. Generally considered better than Burbank, cracks less, better yielder. Tree large, vigorous, upright spreading. Not recommended commercially for late sections. Season, April 20 to May 10 (fig. 7).

Centennial.—A seedling of Napoleon grown by Henry Chapman, introduced by Leonard Coates in 1885. Fruit medium to large, cordate,

yellow with red blush, rather tender, meaty, sweet, good quality. Cracks badly. Not recommended for commercial planting. A good home orchard sort. Ripens with Napoleon. Season, May 10 to June 15.

Fig. 6.—Black Republican cherry tree 18 years old. Typical for a young bearing tree.

Early Purple (*Early Purple Guigne*).—An old Eurepean variety. Fruit medium to small, cordate, reddish purple, tender, sweet, good quality. Tree large, vigorous, upright spreading; one of the earliest

shipping varieties. Recommended commercially only for early shipping sections. Season, April 15 to May 1.

Fig. 7.—Chapman cherry tree about 25 years old. Note the upright spreading habit of growth.

Early Rivers.—A seedling of Early Purple raised by Thomas Rivers in England. Fruit medium to large, roundish-cordate, dark red, rather tender but more firm than Black Tartarian; sweet, good

quality, does not crack. Tree vigorous, spreading, a promising new variety. A little earlier than Black Tartarian. Season, May (fig. 8).

Fig. 8.—Early Rivers cherry tree 11 years old. A rather promising variety.

Giant.—A seedling produced by Luther Burbank in 1900. Fruit large to very large, roundish-cordate, black, sweet, good shipper. Very similar to Lambert. Tree vigorous, upright spreading. Thought by some to be superior to Lambert. Season, June.

There seems to be considerable difference of opinion regarding this variety, several growers maintaining that the Giant is a cherry of the Bing type rather than of the Lambert type.

Knight (*Knight's Early Black*).—An old English variety reported as a seedling of May Duke crossed with Yellow Spanish, by T. A. Knight, Downton Castle, Wiltshire, England, 1810. Fruit medium, cordate, black, tender, rather soft, sweet, good quality. Tree upright

Fig. 9.—Typical Lambert cherry tree about 25 years old. Note the spreading habit of growth.

spreading. Not extensively grown commercially, seems rather particular as to soil requirements. Very few growers recommend it for commercial planting. Ripens about with Chapman. Season, April 20 to May 10.

Lambert.—Originated in Oregon. Reported as a seedling of Napoleon crossed by Black Heart. Fruit large to extra large. Roundish-cordate, red to dark red, very firm, meaty, sweet, very good, shatters badly when overripe. A good shipper. Tree vigorous, spreading, rather irregular bearer in most sections. Cracks badly when there are late rains. Season, June 5 to June 30 (fig. 9).

Napoleon (Royal Ann).—A European variety of unknown origin. The only important commercial canning variety of the Pacific Coast. Fruit large to very large, cordate, yellow with red blush; firm, meaty, juicy, good quality. Cracks badly in seasons of late rains. Tree moderately vigorous, upright spreading, very productive, particular as to soil and climatic conditions. In the interior and foothill sections produces double fruit to a fault. Season, May 15 to June 15 (figs. 10, 11).

Fig. 10.—Left: Napoleon cherry tree 18 years old. Note typical spreading type of growth. Right: Napoleon cherry tree 15 years old. Compare with tree at left. This tree is not typical because it has never produced a crop of fruit.

CHERRY ROOTSTOCKS

The selection of the proper rootstock for cherries is a difficult task. At the present time there are three stocks in use: Mazzard, Mahaleb, and Stockton Morello. Heppner,[3] in a survey of the rootstocks used by California nurserymen for 1926–27, found the following percentages used: Mazzard, 60.8 per cent; Mahaleb, 24.3 per cent; Stockton Morello, 14.9 per cent. The above figures show the Mazzard to be by far the most popular.

Growers are not at all agreed on the rootstock problem. Probably most of them feel that Mazzard is the best, but other growers in the same

[3] Heppner, M. J. Unpublished data.

sections are just as confident that Mahaleb is the better stock to use. The general opinion is that Mahaleb dwarfs the tree. This may or may not be a fault. In ideal situations, on Mazzard root, the trees grow so large that the harvesting expense is excessive. On the other hand, if soil and moisture conditions are not favorable the trees on Mazzard

Fig. 11.—Typical Napoleon cherry tree on Stockton Morello root, 15 years old. This tree is rather severely thinned. Compare with figure 10, left, typical tree on Mazzard.

show serious die-back (fig. 12). If the soil is heavy and tends to be wet, trees on Mazzard and Mahalab will die outright in a very short time.

The Mahaleb, which seems to have a dwarfing tendency, adapts the cherry to drought conditions much better than Mazzard, but will not withstand prolonged saturation of the soil. With many varieties

of cherry propagated on Mahaleb root, in addition to the dwarfing tendency of the tree, there is a marked constriction at the graft union, and the scion overgrows the Mahaleb stock. Where trees are budded low on Mahaleb the dwarfing and overgrowth condition seems

Fig. 12.—Napoleon cherry tree at least 50 years old on Mazzard root. At least two-thirds of the top has been lost from die-back, caused by drought in seasons of scant rainfall. This is in a non-irrigated orchard.

to be largely obviated. While cherry trees on Mahaleb in New York State[4] are short lived, and many California growers feel that the Mahaleb makes a short-lived tree, there are trees in the state over

[4] Howe, G. H. Mazzard and Mahaleb rootstocks for cherries. New York (Geneva) Agr. Exp. Sta. Bul. 544:1–14. 1927.

50 years old, which show no dwarfing effect and are still producing comparable crops to similar trees on Mazzard. The Mahaleb root is seriously attacked by gophers.

The Stockton Morello rootstock has been used extensively in the Stockton district to adapt cherries to heavy wet soils. It is a dwarf stock and shows a very great overgrowth of the scion (fig. 13). The union seems to be strong and no breakage occurs. The varieties propagated on Morello root come into bearing much earlier than on either Mazzard or Mahaleb and the trees tend to overbear, to some

Fig. 13.—Left: A 15-year-old Bing cherry tree, high budded on Stockton Morello. Right: A 15-year old Napoleon cherry tree on Stockton Morello, showing typical overgrowth. The Bing overgrows the stock less than most other varieties.

extent at least. This stock also suckers badly. At the present time, however, suckering may be considered as a good fault as the demand for suckers for propagation exceeds the supply (fig. 14). The Stockton Morello does not come true from seed; therefore, it is necessary to use the suckers instead of seedlings for rootstocks.

In the last few years considerable interest has been shown for this stock and numerous plantings have been made in many parts of the state. These trees, however, have not been under observation for a sufficient length of time to determine definitely how the stock will respond. If it does as well in other sections as it is doing in San Joaquin County, it certainly is worthy of trial.

The Chapman variety is uncongenial with Stockton Morello root and requires double-working. This is the only variety, as far as is known, which cannot be propagated on Stockton Morello root.

Fig. 14.—Typical 15-year-old Bing tree on Stockton Morello root. Note the Morello suckers in the foreground which are in great demand as stocks.

POLLINATION[5]

Experiments extending over a number of years, not only in California but in other states and several foreign countries, show conclusively that all varieties of sweet cherries are self-unfruitful, i.e., they will not produce crops when self-pollinated. Varieties do not

[5] For a detailed account of the pollination requirements for cherries see: Tufts, W. P., and G. L. Philp. Pollination of the sweet cherry. California Agr. Exp. Sta. Bul. 385:1–28. 1925.

all bloom at the same time, and so care must be exercised to select varieties which are not only inter-fruitful but which bloom approximately at the same time.

Blooming Period.—The average period of bloom for most varieties is about two weeks. Weather conditions just preceding and during bloom have a marked influence upon the length of the period of bloom and also upon the dates of blooming. Because of climatic condition, the dates may vary as much as three or four weeks in different seasons.

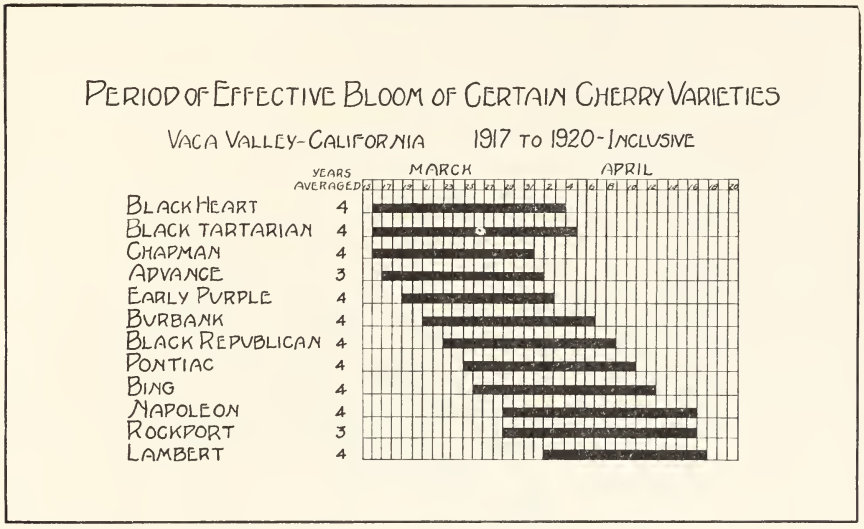

Fig. 15.—The period of effective bloom of certain cherry varieties, covering a period in nearly all cases of four years. The number of years averaged is shown in a separate column for each variety. (From Bul. 385.)

Varieties, however, keep approximately the same order of blooming each season and may be divided roughly into early and late bloomers as follows:

Early bloomers	*Late bloomers*
Advance	Black Republican
Black Heart	Bing
Black Republican (mid-season)	Lambert
Black Tartarian	Napoleon
Burbank	Pontiac
Chapman	Rockport
Early Purple	

The accompanying chart (fig. 15) gives the period of effective bloom of the above varieties. It should be noted that there is no definite break between the early and late bloomers but a gradual gradation from one to the other.

Fruitfulness of Varieties.—Since all varieties of sweet cherries are self-unfruitful, varieties must be interplanted. Unfortunately certain varieties are inter-unfruitful and if planted together will not set fruit. This is true with Bing, Lambert, and Napoleon, three of the most important commercial varieties. If an orchardist desires to grow

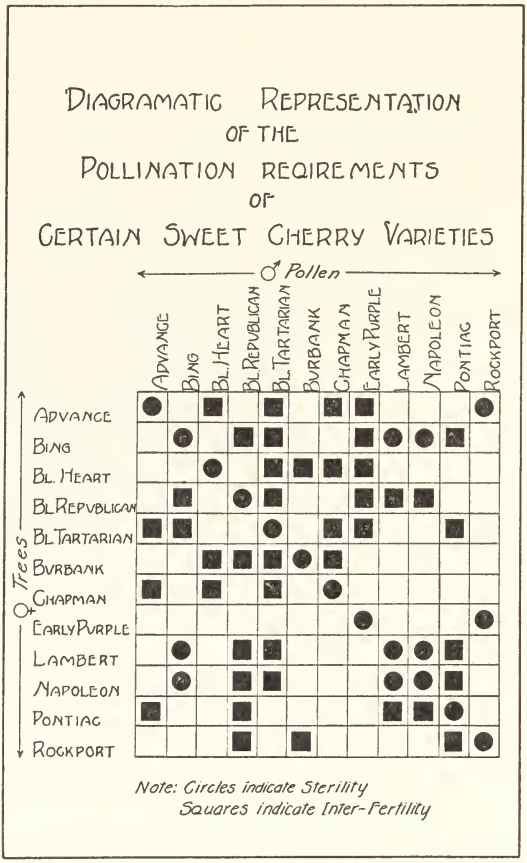

Fig. 16.—This chart indicates the pollination requirements of certain sweet cherry varieties. The circles indicate sterility, the squares indicate interfertility, and the blank spaces crosses which are not recommended or which have not been made. (From Bul. 385.)

any one or all three of these varieties he *must* plant other varieties with them to secure fruit. Of the desirable pollinizers Black Republican and Black Tartarian are the best ones to use. Either or both will generally be satisfactory, particularly for Bing and Napoleon. However, they are not entirely satisfactory for Lambert, because of its lateness of bloom, and will be satisfactory only in seasons

of very favorable bloom. This probably is the reason that Lambert is generally regarded as a very irregular yielder.

It should also be pointed out that there are "strains," particularly of Black Tartarian and, therefore, it is unsafe to depend entirely on this one variety to pollinate the orchard.

The chart numbered figure 16 shows graphically the pollination requirements of certain cherry varieties.

Arrangement of the Pollinizers.—When the minimum number of pollinizers are desired, one tree in nine, planted as every third tree on every third row is recommended. Grafting one or more pollinizers into every tree is also a desirable practice from a pollination standpoint. Either of the above suggestions offer objections in harvesting, so in planting a new orchard it is more desirable to plant in rows with at least every fourth row a pollinizer. For convenience in harvesting, it is best to plant two rows of the pollinizer, then two or four of the favored variety, and repeat.

Desirability of Bees.—Since cherries are pollinated only by insects, mainly bees, it is of great importance to provide bees during the blooming period. In intensive fruit sections where wild bees are few it is necessary to import colonies for the blooming season if the grower does not keep bees. At least one hive per acre is desirable, distributed as widely as possible throughout the orchard.

TOPWORKING AND PROPAGATION

It is not a general practice to topwork mature cherry trees except to introduce pollinizers into an orchard of a single variety, or where intersterile varieties are planted. The commonly accepted methods of topworking which are discussed in the circular on propagation are recommended.[6]

In sections where bacterial gummosis is serious some growers plant the seedlings in the orchard and allow them to grow for several years, forming the framework. Then the seedlings are worked over, preferably budded, to the desired varieties, thus getting a more or less resistant trunk and framework. The Mahaleb is more resistant to gummosis than the present Mazzard stock.

The cherry like most other fruits does not come true from seed. In order to obtain commercial varieties it is, therefore, necessary to

[6] Topworking and propagation are fully described and illustrated in: Stahl, J. L. Propagation of deciduous fruits. California Agr. Exp. Sta. Cir. 294:1–24. 1925.

bud or graft seedlings, or suckers in the case of the Stockton Morello, to the variety desired. In commercial production of nursery trees budding is the method used. The usual practice is to grow the seedlings in a seed bed one year. The following year these seedlings are lined out in the nursery row, where they are allowed to grow until August or September, when they are budded to the desired variety. The spring following budding, before growth starts, the seedling top is cut off, back to the inserted bud. This forces all the growth into the bud, which develops into the nursery tree of the desired variety. At the end of that growing season there is, then, available a one-year-old tree with a three-year-old root system. The nursery trees are dug and graded according to size into the following grades:

6 to 8 ft. grade—trees to caliper not less than ¾ inch
4 to 6 ft. grade—trees to caliper not less than ½ inch
3 to 4 ft. grade—trees to caliper not less than ⅜ inch
2 to 3 ft. grade—trees to caliper not less than ¼ inch

It is the general opinion that the medium-sized tree is the most desirable for planting. It is doubtful if the smallest size should be ordered when it is possible to get trees which have made a better growth.

Upon arrival of the trees they should be removed from the original package and, if not planted at once, "heeled-in" in a convenient, well-drained location slanted toward the southwest, so as to protect the trunks from the afternoon sun. If the roots are dried out in shipment they should be soaked in water several hours before heeling in. If the whole tree is dried out, it can very often be saved if it is completely covered with moist soil for several days before heeling in.

PREPARATION FOR PLANTING

The proper preparation of land previous to planting is of great importance in giving the trees a satisfactory start. The majority of land planted to cherries has been previously cleared so that preparation is mainly a question of deep plowing, breaking up the plowpan, if present. Where irrigation is practiced it is highly important that the land be properly leveled. In some few sites the question of drainage may be important, though in general cherries are not adapted to conditions of soil where there is not good drainage.

It is doubtful whether any good cherry soil requires fertilization previous to planting though the use of a green manure crop the year previous to planting may be desirable, primarily to improve soil tilth.

In most of the cherry districts of the state irrigation is desirable, if not necessary, for young orchards, and in most sections it is necessary for bearing orchards. Therefore, it is undesirable to start a new orchard without irrigation facilities.

ORCHARD PLANS

Great care should be given to laying out the orchard previous to planting. While trees will grow as well in crooked rows as in straight, tillage operations will be more difficult. Moreover, most growers will take sufficient pride in their orchard to see that the trees are planted in straight rows. The majority of the orchards are planted by the square system, though some growers prefer the alternate or diagonal system of planting. The various methods of laying out orchards are discussed by Wickson.[7]

The proper distance for planting cherry trees is important.[8] Probably no sweet cherries should be planted closer than 24 feet (Dwarf trees on Stockton Morello root excepted) and for good growing conditions a greater distance (28–35 feet) would be desirable. There are many old cherry trees in the state with a spread of 35 to 40 feet.

After the planting plan has been selected the arrangement of the varieties from a pollination standpoint is very important. It is desirable to have at least every fourth row and preferably every second row of a pollinizing variety. For convenience in harvesting, it is best to plant two rows of one kind, then two rows of the pollinizing variety, and so on; or if it is desirable to have more of one variety than another, four rows of the favored variety and then two rows of the pollinizer, and repeat. Under some conditions it is desirable to have the minimum number of pollinizers. Under these circumstances one tree of the pollinizer to eight of the favored variety is recommended, planted as every third tree in every third row.

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[7] Wickson, E. J. California fruits and how to grow them (10th edition), pp. 85–92. Pacific Rural Press. 1926.

[8] Allen, F. W. Planting and thinning distances for deciduous fruit trees. California Agr. Exp. Sta. Bul. 414:1–29. 1926.

PLANTING THE ORCHARD

In setting the trees, compacting the soil around the roots and planting at approximately the same depth that the trees grew in the nursery are probably the two most important factors in getting a uniformly vigorous stand. Trees may be planted with success any time between the first of January and the first of March, when the soil is in good tilth and not too moist or wet. If attempting to plant earlier than that it is difficult to get properly matured and dormant trees from the nursery. If planted later, in most sections, the trees will not have become established and root growth well started before warm weather sets in and excessive water loss will take place. It is preferable to plant as soon after the first of the year as possible, whenever the soil is in good working condition.

When the trees are dug from the nursery half to three-fourths of the root system is destroyed. It is desirable to remove broken and damaged roots and shorten the longer roots to about six inches in length before planting. To compensate for the loss of roots in digging, it is desirable to cut back the top of the tree. It is also desirable to cut back the top to form the head at a convenient height, probably between 24 and 30 inches from the ground.

The sweet cherry is rather susceptible to sunburn, and to borers. Consequently it is desirable to protect the newly planted trees from sunburn immediately after planting. Growers differ in their recommendations; some prefer a coat of whitewash, while others recommend the use of tree protectors. The protectors are entirely satisfactory if properly put on so that they will not drop down later in the season and expose the tender trunk bark. In the use of whitewash it is often necessary to go over the trees at least twice the first season.

A satisfactory whitewash may be made by the following formula:

Fresh rock lime	5 pounds
Salt	½ pound
Sulfur (flowers)	¼ pound

While the lime is slaking add the salt and sulfur, mixing well, later thinning to the desired consistency. Allow this whitewash to cool thoroughly before using. It will stick better if allowed to age several days before applying to the trees. Some growers prefer to use cold water paint rather than go to the bother of making up a whitewash. Cold water paint sticks satisfactorily.

CARE OF YOUNG GROWING TREES

After the orchard is set out it is desirable to keep the trees growing vigorously. The recommended practice of clean cultivation for young orchards probably is desirable for most locations, especially where irrigation is not possible. One or two irrigations a season, depending on soil, climate, etc., will be desirable for best growth in most locations.

It is very often necessary for the orchardist to grow intercrops in the young orchard. With conditions of good soil and plenty of moisture there probably is no objection to planting intercrops in the young cherry orchard as long as the orchardist remembers that the cherry trees are the main crop and does not grow the intercrop at the expense of the trees.

It is questionable whether the addition of artificial fertilizers to a young cherry orchard is desirable or necessary. This is especially true if good orchard soil has been selected for the trees. There is no doubt, however, that the use of winter covercrops or green manure crops is a desirable practice.

CARE OF BEARING ORCHARDS

The question of moisture regulation and tillage is extremely important in mature cherry orchards. The practices by different growers in the various cherry growing areas of the state differ greatly. Some growers maintain that one irrigation a year is sufficient, while others argue that the soil should be kept moist for a depth of 16 feet, at all times. In the Santa Clara Valley it is a general practice to irrigate once before the crop is harvested and twice after, followed by a thorough winter irrigation.

In the hot dry valley locations most cherry growers plan on irrigation, but as previously indicated their practices vary from a single irrigation to as many as four applications. No definite recommendations can be made regarding irrigation as the soil, climate, rainfall, etc., will influence the amount of water applied and the number of irrigations necessary. The main point to keep in mind is the necessity of not allowing the trees to suffer from the lack of moisture. This is particularly true of trees on Mazzard root (fig. 12).

In non-irrigated locations, especially in years of scant rainfall, supplementing rainfall with irrigation would be desirable if it were possible to irrigate. However, in these locations no irrigation facilities

are available, which generally means less vigorous trees and smaller sized fruit.

The general tillage practice in the cherry sections of the state is clean culture during the summer. Plowing or disking in the early spring is followed by more or less frequent cultivations. The frequency of summer cultivation should depend on weed growth and frequency of irrigation. Recent studies by Veihmeyer[9] indicate that cultivation for the conservation of moisture is unnecessary so long as the soil is kept free from weeds or other growth. Frequent cultivations after the weeds are killed, or the crust broken up are, therefore, unnecessary and expensive.

FERTILIZATION AND COVERCROPS

We have no experimental data showing that the sweet cherry responds to the application of fertilizers. Experiments with sour cherry fertilization[10] indicate that the trees respond to applications of nitrogen. Chandler[11] reports that the sour cherry seems to respond to nitrogen fertilizers but that little is known as to the response to high or low potash or phosphorus supply. Observation indicates that the sweet cherry when the nitrate supply is low may make striking response to applications of available nitrogen.

The use of manure and nitrate fertilizers in California cherry orchards is becoming a common practice. Many growers recommend using as much manure as they can get. In most cases this means from two to ten tons per acre applied occasionally. The kind of manure used depends upon the available supply. There seems to be no recommended practice regarding its application. However, where manure is used best results seem to be obtained when the application is made in the fall.

In the use of inorganic fertilizers there is a wide difference of opinion. The only material being used extensively is a nitrogen fertilizer and in most cases sulfate of ammonia seems to be the favored material, used in amounts varying from two to twenty pounds per tree. The most general practice is to use from four to seven pounds per tree applied just before bloom.

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[9] Veihmeyer, F. J. Some factors affecting the irrigation requirements of deciduous orchards. Hilgardia, 2:125–290. 1927.

[10] Tukey, H. B. Responses of the sour cherry to fertilizers and to pruning in the Hudson River Valley. New York (Geneva) Agr. Exp. Sta. Bul. 541:1–26. 1927.

[11] Chandler, W. H. Fruit growing, p. 315–316. Houghton-Mifflin Co. 1925.

The use of covercrops is about as variable with cherries as with other fruits. Some growers insist that it is highly desirable, if not necessary, to use a covercrop annually. Most growers advise a leguminous covercrop; and *Melilotus indica* seems to be the favorite, though some prefer vetch, bur clover, or the small-seeded horse bean.

In practically all locations where covercrops are grown the annual winter covercrop is the one used, which is plowed under in the spring and clean culture practiced during the summer. In the Lodi section a number of growers are using a permanent alfalfa covercrop, with apparently good results. It should be kept in mind, however, that the use of a summer covercrop necessitates an increased water supply and, therefore, can be used only where sufficient irrigation water is available.

PRUNING[12]

Training and Pruning Young Trees.—There are three methods of training young trees: (1) leader type where the central or uppermost branch is allowed the ascendency and becomes the main leader; (2) the open center or vase-shaped tree where the scaffold branches have equal dominance and no branch is allowed to grow at the expense of the others; and (3) the modified leader or delayed open center. In the delayed open center type the tree is started as a leader tree and the upper branch is allowed the dominance but is directed outward after the first two or four years. Allowing the topmost branch to assume the lead for several years enables one to obtain greater spacing of the scaffolds on the trunk. It is felt that this type of tree has much in its favor and should be more extensively used.

Most cherry trees in California are trained as vase or open-centered trees. At the time of planting the tree should be cut back to balance the top with the root system and also to form the head at a desirable height (24–30 inches). During the first summer lateral branches will develop which will form the primary framework of the tree, three to five being selected for this purpose, preferably three. If the trees start out vigorously, the selection of the framework branches may be made in May of the first growing season. In this case the undesirable branches should be subdued by cutting them back and the ones selected for the framework allowed to grow undisturbed.

[12] For greater details of pruning see: Tufts, W. P. Pruning young deciduous fruit trees. California Agr. Exp. Sta. Bul. 313:113–153. Revised 1927. Also: Tufts, W. P. Pruning bearing deciduous fruit trees. California Agr. Exp. Sta. Bul. 386:1–47. 1925.

In those orchards making only moderate growth the trees should not be summer pinched but should be allowed to grow undisturbed until the dormant pruning when the selection of the framework is made. In selecting the framework branches only those should be left which will make a symmetrical head.

The branches should be properly balanced around the trunk and spaced up and down the trunk as far apart as possible (six to eight inches). Care should be taken not to select two branches opposite each other on the main trunk, particularly if using the open center type of tree, as invariably the center branch will be choked out. These primary scaffolds should be headed at fifteen to thirty inches or more from their juncture with the trunk.

Since young vigorous cherry shoots tend to branch only near the tip, it seems desirable under most conditions to head the new growth moderately for the first three or four years, in addition to thinning out undesirable branches.

Where vigorous growth is obtained the second and third summer, one or more years' training may be saved by summer-pinching the vigorous shoots in May. This practice will force lateral branching and also give spread.

Pruning Bearing Trees.—The purpose of pruning bearing trees is to remove dead and interfering branches and also to renew the fruiting wood. The sweet cherry produces its fruit laterally on long-lived spurs which are economically productive ten years or more. The cherry, therefore, needs less renewal wood than most any other deciduous fruit. Most cherry growers do very little pruning on bearing trees. The general practice is to remove dead wood in the early summer following harvest, at which time it is more easily distinguished than is the case in the winter when the trees are dormant. In addition to the removal of dead wood, cross and interfering branches are cut out from time to time.

The sweet cherry is subject to die-back, especially trees on Mazzard root where soil and moisture conditions are not entirely congenial. This condition is very often responsible for the dying of the tops of cherry trees, necessitating removal of rather large amounts of dead wood. However, it must be kept in mind that no pruning treatment will overcome unfavorable soil or moisture conditions.

DISEASES OF CHERRIES AND THEIR CONTROL[13]

Diseases of plants are of three kinds, depending upon their cause. They are: (1) fungus diseases caused by fungi and usually controlled by spraying; (2) bacterial diseases caused by bacteria within the tissue and generally impossible to be controlled by spraying; (3) physiological diseases produced, generally, by some functional disturbance which is often impossible to determine.

Bacterial Gummosis (*Bacterium cerasi* Griffin).—This is a serious cherry tree disease which attacks buds, twigs, spurs, branches and trunks, accompanied by copious gum formation. The gum is generally amber colored. The disease is usually most active during the spring and early summer and may be spread through wounds. Control is difficult although the scarification method[14] used with pear blight seems promising. Whenever the bark is killed in large areas the dead bark should be scraped out to the wood and Bordeaux paste applied to prevent wood rots. No other disinfectants than Bordeaux need be used after the scarification work.

Recent studies indicate that there may be several bacteria causing gumming on cherries; also there are, apparently, physiological disturbances which cause serious gumming without bacteria being present.

In sections where gummosis is serious it probably is desirable to grow the seedlings in the orchard, forming the framework of the stock which is more resistant than the various varieties. Mahaleb is more resistant than the types of Mazzard commonly used by the nurserymen. Bing and Napoleon are more susceptible than other commercial varieties, and Lambert is seldom injured. The Duke and sour cherries are highly resistant. Sweet cherry trees on Stockton Morello roots seem less susceptible to the disease than those on the ordinary Mazzard root, possibly owing to the less rapid growth.

In the Lodi district many cherry orchards have been sown to alfalfa. This practice seems to be of decided benefit in rendering the trees less subject to bacterial gummosis.

Brown Rot.—[*Sclerotinia cinerea* (Bon) Schroet.] Brown rot is not generally serious on cherries, but in some years it does considerable damage. It attacks the blossoms and runs down into the fruit spur, killing it. The blossoms and leaves dry up and remain on the spur, and there generally is an exudation of clear gum from the spur.

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[13] Horne, W. T., E. O. Essig, and W. B. Herms. Plant disease and pest control. California Agr. Exp. Sta. Cir. 265:1–124. 1927.

[14] Day, L. H. Pear blight control in California. California Ext. Cir. 20:1–50. 1928.

The fruit is also attacked, especially in years of late rains, and generally is most severe in areas having coastal influence of fog and moist, cloudy weather. Fruit destroyed by brown rot dries up and generally remains attached to the spur during the winter and acts as a source of infection for the following season.

Cherry growers do not regularly spray for brown rot control. Those that do generally use Bordeaux mixture 5–5–50 to 8–8–50 as the first blossoms are opening. This application is satisfactory except in seasons of rain during harvest, when serious loss occurs from the fruit rot stage.

Leaf Spot (*Coccomyces hiemalis* Hig. = Cylindrosporium).—This disease appears as small brown spots on the leaves, the underside of which show whitish coating of spores. This disease also affects the fruit stem and certain seasons causes serious loss. It is not considered serious in California except in certan districts near the coast, and no spray program has been thoroughly worked out. One grower says he gets 100 per cent control with Bordeaux applied when the blossoms show white, care being taken to thoroughly coat the flower stem. In the east the following recommendation is given: Spray with Bordeaux mixture: (1) when three-fourths of the petals have fallen; (2) two weeks later; (3) just after the fruit is picked.

Oak Fungus.[15]—[*Armillaria mellea* (Vahl) Quel.] This disease is caused by a fungus which is both a saprophyte and a parasite. It works almost entirely on the roots underground. Cherry trees are killed in areas which enlarge from year to year. Since the disease spreads mainly from root to root, it travels very slowly and, for that reason, is considered as a disease of old trees. Fig, black walnut, and French pear are the most resistant of our common orchard trees. In oak fungus spots in cherry orchard it will be necessary to plant an annual crop or use one of the above-mentioned resistant trees. The cherry is susceptible, and usually the tree is so seriously infected that no control is possible. Sometimes, however, on slightly infected trees, considerable benefit may be obtained by digging away the soil from about the crown and removing all diseased bark on the main trunk and all dead roots out to a distance of several feet. The cut surfaces should be covered with Bordeaux paste and left exposed for several weeks.

Buckskin Disease.—An abnormal condition found mainly on Napoleon, Black Tartarian, and Chapman varieties. The disease stunts and deforms the fruit, the affected specimens never mature

[15] Hendrickson, A. H. Oak fungus in orchard trees. California Agr. Exp. Sta. Cir. 289:1–13. 1925.

and develop only a fourth to a half normal size. The flesh has a translucent appearance and is tough.

There is no prevention or control known at present. It is thought by some to be a soil trouble; others believe it to be a virus or related disease, though in one section it seems to be associated with little leaf and crinkle leaf.

It is confined almost entirely to trees on Mazzard root. Dr. T. E. Rawlins[16] of the Plant Pathology Division of the University of California in a survey of buckskin in one section, found that of 147 trees on Mazzard root 52 showed buckskin, while of 82 trees on Mahaleb only three showed the trouble. All three of the trees on Mahaleb showing buckskin, however, had rooted above the graft union. The above report would seem to indicate that trees on Mahaleb root are resistant, if not immune to buckskin. It also suggests the advisability of using high-budded trees to prevent the scion from taking root.

Crinkle Leaf (Red Bud, Bachelor Tree, He Tree).—This trouble seems to affect Black Tartarian more commonly than other varieties. However, other varieties are not immune. It is probably a soil trouble but is thought by some to be a virus disease. The trouble affects the foliage, mainly, deforming the leaf and giving it a crinkled appearance. The leaves generally are slightly yellow, having a mottled or marbled appearance. It may affect a single branch or the entire tree. Many of the fruit buds fail to completely open, which has suggested the name "red bud." With bad infections the fruit is slightly deformed, having a pointed, beaked appearance. Trees affected never set a full crop. Some people consider this to be a bud sport.

It is sometimes found associated with little-leaf condition. The two troubles may be related. There is no known prevention or cure at present.

Little Leaf.—This is a physiological trouble supposed to be caused by some unfavorable soil condition. It affects the new growth and foliage. The shoots are weak and in bad cases die. The foliage is small and yellow in color. It may affect only one branch, in light cases, or the entire tree. Sometimes a shoot dies back part way and many new shoots grow out and give a witch's broom effect. There is no complete commercial control or remedy at present. Where alfalfa is grown among the trees little leaf is much less prevalent. Trees affected with little leaf respond to treatment with iron sulfate applied to the soil, but in most soils such large amounts are required that it is impractical. In old corrals and poultry yards, if later planted to trees, a similar little-leaf condition very often develops.

[16] Rawlins, T. E. Mimeographed progress report on cherry buckskin disease. 1929.

INSECTS OF CHERRIES AND THEIR CONTROL

Black Cherry Aphis (*Myzus cerasi* Fabr.)—This is a shiny black aphis attacking the cherry in spring and early summer, causing severe curling of the leaves and is one of the most troublesome pests in home orchards. In serious infestations it does considerable damage especially to young orchards and nursery trees. Controlled by spraying with 1 pint 40 per cent nicotine sulfate, 4 pounds fish or whale oil soap, and 100 gallons of water; or dusting with 5 per cent nicodust soon after blossoming when aphis appear and before the leaves curl.

Cankerworms (*Fall and Spring Cankerworms*).—These are small greenish or dark measuring worms about one-half inch long which feed upon opening buds and the leaves mostly, with some damage to young fruit. Females are wingless and crawl up the tree in spring or fall to lay eggs. Control consists of preventing females from crawling up the tree by using tanglefoot or screenwire bands around the trunk of the tree. Spraying with basic arsenate of lead powder, 2 to 4 pounds per 100 gallons will kill most of the worms. Recently better control has been obtained by using insect powder, pyrethrum or buhach, than with arsenate of lead. Insect powder must be fresh as it loses its strength with age. Soak 2½ to 5 pounds overnight in 5 gallons of water, then add enough water to make 200 gallons of spray.

Cherry Fruit Sawfly (*Hoplocampa cookei* Clarke).—A small white worm (larva) which works within the immature fruit of plums and cherries. It is not an universal pest but in some seasons it does considerable damage in certain sections. Its presence is recognized by the yellowing and dropping of the half-grown fruit which show round exit holes, where the larva emerge. The best control consists of applying standard arsenate of lead powder, 2½ to 5 pounds per 100 gallons of water just as the petals are opening.

Cherry Slug (*Eriocampoides limacina* Retzius).—The slug attacks both cherry and pear but generally not in sufficient numbers to necessitate control measures. The worm is a slimy green or blackish larva about one-half inch long which feeds on the leaves and some years in sufficient numbers to defoliate the trees.

Control is comparatively easy due to the slimy covering of the insect and consists in using any one of various dusts: as hydrated lime, ashes, roaddust, 2 to 5 per cent nicodust or spraying with arsenate of lead 2½ to 5 pounds per 100 gallons of water. However, arsenate of lead should not be used when the fruit is nearly ripe, but rather after harvest. It is the most satisfactory method of control.

Red-humped Caterpillar.—[*Schirula concinna* (A. & S.)]. The caterpillars are from one to two inches long when full grown and may be identified by the large red hump on the back. They work in colonies but do not spin a web. The damage consists in defoliation of shoots or entire young trees. The caterpillars eat the leaves, except the large veins, mid rib and petiole.

Control measures consists of picking off and destroying the colonies on young trees or spraying with arsenate of lead with 2 to 3 pounds per 100 gallons of water, or dusting with equal parts of powdered arsenate of lead and hydrated lime. For satisfactory control by spraying or dusting it is advisable to apply the arsenical before the caterpillars are full grown.

Pear Thrips (*Taeniothrips inconsequens* Uzel).—These insects are often a serious pest of the cherry. It is a small black insect about $\frac{1}{16}$ inch long which appears about the time the buds or blossoms begin to open. The young or white thrips work on the late blossoms, young fruit and leaves. Control consists of spraying with summer oil, 3 gallons, 40 per cent nicotine sulfate, 1 pint, and water to make 200 gallons. Repeated dusting with 5 per cent nicodust will also control them.

Flat-headed Borer (*Chrysobothris femorata* Fabricius).—This borer is discussed under the heading of planting the orchard.

HARVESTING THE CHERRY CROP[17]

Picking Equipment.—The three-legged or tripod ladder is the standard for orchard use. There are a number of satisfactory makes on the market. They should be strong, light and well constructed. These ladders are made in various lengths from six feet up.

Various types of picking receptacles are used. Probably the most common, in the shipping districts, is the galvanized-iron cherry picking cup which straps to the picker's waist (fig. 17*C*). Other growers use various sized galvanized-iron water pails (figs. 17*A*, 17*B*). The cherry picking cup is preferable for fruit for fresh shipment where the greatest handling care is necessary. For local sale or cannery the larger water pail type is satisfactory.

Delivery Containers.—For cannery stock the 50 to 60-pound lug box is the standard container used. Where fruit is for eastern shipment the common practice is to dump the fruit from the 'cup' into

[17] Duruz, W. P. Harvesting and handling California cherries for eastern shipment. California Agr. Exp. Sta. Cir. 232:1–19. 1922.

the galvanized pail for delivery to the packing house. Other growers pick directly into the water pail, which is also used to deliver to the packing house. This eliminates one handling and is satisfactory if not filled too full, and when the bucket can be filled from one setting of the ladder. Numerous growers dump the cherries into lug boxes of various sizes. Where this is done the lugs should not be filled too full and also corrugated paper pads and liners should be used to eliminate bruising.

Fig. 17.—Various picking receptacles: (*A*) Large fruit picking pail, almost too large for cherries. (*B*) Galvanized water pail, a satisfactory cherry picking receptacle. (*C*) The cherry picking cup, extensively used in some of the early shipping sections.

Delivery Trucks and Wagons.—The auto truck with pneumatic tires is a common, satisfactory conveyance for delivering cherries from orchard to packing house and then to the shipping point. If wagons are used only those equipped with good springs are advisable. Neither springless wagons nor solid-tired trucks are advisable.

Picking Hooks.—A picking hook is very desirable in picking cherries as it enables the picker to pull the long branches within reach, thereby lessening the number of times it is necessary to reset the ladder. A forked branch is very often used and is satisfactory. However, a pole about four feet long with a hook at both ends is more desirable. This makes possible pulling a limb within reach and fastening it to the ladder or another branch, so the picker has both hands free to pick the fruit.

PICKING THE FRUIT

The Time to Pick.—The time to pick will depend upon several factors—whether for eastern shipment; for local fresh shipment; for cannery or other by-product use; and also upon variety. In general the early softer fleshed varieties like Chapman, Burbank, Black Tartarian, are picked less mature than the later more firm varieties like the Bing, Black Republican, and Lambert. While specific directions cannot be given for all conditions, in general the earlier sorts, which when tree ripe are dark red to black, are generally picked when they have attained a good red color and are fairly sweet. The later sorts, on the other hand, should be a dark or purplish red before being harvested.

Recent studies by Hartman and Bullis[18] indicate that the time of harvesting does not seem to greatly affect the shipping quality of sweet cherries. When the fruit reaches full maturity on the trees it generally holds up sufficiently well to ship to eastern markets.

The Napoleon, the only variety canned or extensively used for other by-products purposes is a white or yellow fleshed variety with a distinct blush on the exposed cheek. This variety is also shipped east to some extent. For shipment it should be harvested when it has attained a good yellow color and is fairly sweet. For canning or processing it should be allowed to become more mature before harvesting.

How to Pick.—Cherries for eastern shipment must be picked with stems attached, otherwise the skin will be broken and the fruit will not hold up in shipment. In removing the fruit from the spur the operator grasps the cherry stem firmly between the thumb and forefinger, giving it an upward twist. Care must be taken not to break the fruit spur.

Normally fruit for canning or processing should be picked with stems. However, where the fruit is delivered to the cannery or processing plant immediately it may be picked without stem.

In all cases the fruit should be placed carefully into the picking receptacles and never be thrown or dropped into the containers.

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[18] Hartman, H., and D. E. Bullis. Investigations relating to the handling of sweet cherries. Oregon Agr. Exp. Sta. Bul. 247:1–38. 1929.

PACKING AND PACKING EQUIPMENT

As previously stated, only fruit for distant shipment is packed, fruit for canning and for processing being delivered in field lugs.

The first prerequisite for packing cherries is a well lighted, conveniently arranged packing house. At present, in most cherry packing houses, all sorting, grading, and packing is done by hand from conveniently arranged packing tables (fig. 18). Recently, however, a

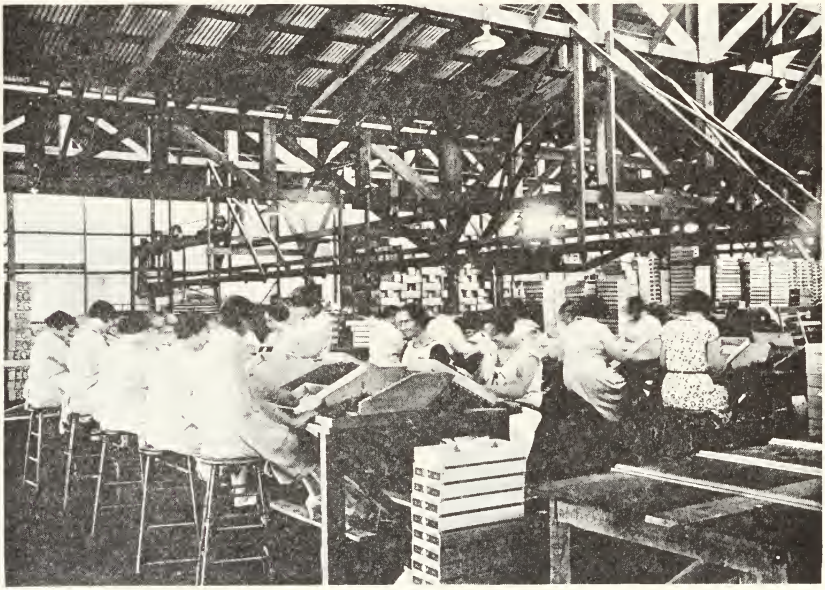

Fig. 18.—Interior of packing house. Note arrangement of packing tables and packing trays.

few growers are using cherry graders. These graders consist of a dumping platform above which is arranged a suction fan that removes the leaves, bud scales, etc., from the fruit. The fruit moves forward slowly on a series of endless belts, at the end of which is placed one of the various types of containers. When the lug is filled it is replaced by another empty one. As the fruit passes along on the endless belts it is sorted. The culls are removed and the small specimens are picked out. In some packing houses the fruit is also sorted for color. Generally, however, only the overripe fruits are picked out and no attention is given to fruit of various degrees of ripeness.

Where cherry graders are used no attempt is made to place the individual fruits in the box. Care is taken to fill the corners of the boxes and to see that the minimum net weight is contained in each package. When hand packing is done the standard cherry box is extensively used. The box is made with a divider in the center separating the box into two equal sections. This box contains eight pounds net. When the box is made the top is nailed on so in packing the face or top layer of fruit is placed in first.

The cherries are carefully sorted and graded to size and placed in the box on their cheek with the stems toward the packer. After the

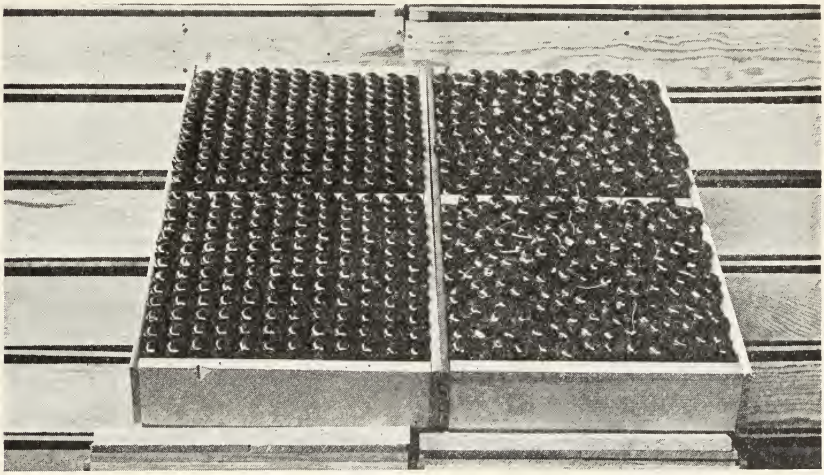

Fig. 19.—The standard cherry box. The box at the left shows the top view of the pack. Note the "facing." The box at the right shows the bottom view, and presents no arrangement of the fruit.

first layer is finished the second layer is placed so that the fruit rests in the spaces formed by the cherries of the first layer. This is known as "double facing." When one section is faced the box is turned end for end and the other section faced in a like manner. The remainder of the box is filled with fruit without definite arrangement. The bottom is finished off, care being taken to fill the corners and to have no fruit extending over the sides. The bottom is then nailed on, the box turned over and the top opened to see that no overripe, bruised or cull fruit has been placed in the package.[19] (fig. 19).

[19] In packing cherries for shipment, certain state regulations regarding packing, maturity, containers, etc., must be followed. Copies of these regulations of the California Fresh Fruit and Vegetable Standardization Act may be obtained from the California State Department of Agriculture, Sacramento, Calif.

In packing lugs, facing, as described above, is very seldom practiced. Some growers "bunch face" by placing a small number of fruits in the box at a time, stems up, without any regular arrangement (fig. 20). The lug is then filled, care being taken to fill up the corners and edges. Generally, however, no facing is done in packing the lugs.

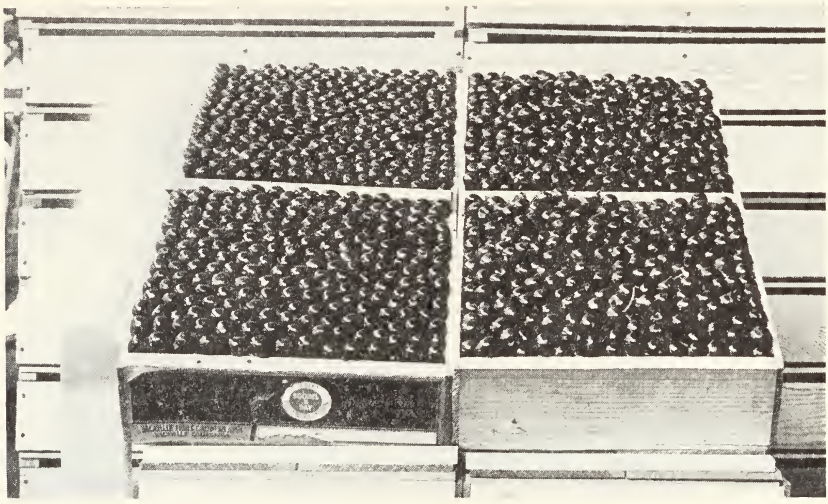

Fig. 20.—Lambert lug, "bunched face." The box at the left shows the top view and the box at the right shows the bottom view. Note that there is no regular arrangement of the fruit. Compare with figure 19.

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